

THE CLAIMS

What is claimed is:

1. A method for providing access to a communications medium, the communications medium being suitable for allowing use of Home Phoneline Network Association (HPNA) v2-formatted frames, each HPNA v2-formatted frame being timed to allow a plurality of physical layer priority level slots, the method comprising steps of:

maintaining a list of sessions in enhanced stations (STAs) using the communications medium, each enhanced STA being one of a Media Control Station (MC STA) and a non-Media Control Station (Non-MC STA), and each enhanced STA gaining access to the communications medium in a centralized manner; and

transmitting a message from the Media Control Station (MC STA) to at least one selected non-MC STA using the communications medium, the transmitted message being transmitted with a highest physical layer priority level available in a first HPNA v2-formatted frame.

2. The method according to claim 1, wherein a frame encoding of at least one HPNA v2-formatted frame is modified to allow a higher encoding rate than permitted by HPNA v2.

3. The method according to claim 1, wherein a frame header encoding of at least

the first HPNA v2-formatted frame is modified to allow one of a polling frame, a beacon frame, a Centralized Contention (CC) frame, and a management frame.

4. The method according to claim 3, wherein when the HPNA v2-formatted frame is modified to allow a Medium Allocation Element (MAE) in the management frame.

5. The method according to claim 4, wherein the management frame is a Beacon frame.

6. The method according to claim 1, wherein the transmitted message is one of a polling frame, a data frame and a management frame, and includes an encoding indicating a frame type within a body of the transmitted message.

7. The method according to claim 1, wherein the highest physical priority level slot of the first HPNA v2-formatted frame is PRI 7.

8. The method according to claim 1, wherein at least one HPNA v2 STA is associated with the communications medium,

the method further comprising steps of:

determining whether the message has collided with a message transmitted

from an HPNA v2 STA;

selecting a Backoff Signal slot by the MC STA for contending for access to the communications medium when the message is determined to have collided with a message from an HPNA v2 STA, the selected Backoff Signal slot being associated with the highest access priority to the communications medium; and

retransmitting the collided message when access priority to the communications medium is gained.

9. The method according to claim 8, wherein the step of selecting the Backoff Signal includes a step of repeatedly selecting the highest priority Backoff Signal slot until the MC STA gains access priority to the communications medium over each HPNA v2 STA.

10. The method according to claim 9, wherein at least one HPNA v2 STA repeatedly selects a Backoff Signal slot based on a predetermined sequence of Backoff Signal slot selections.

11. The method according to claim 10, wherein each predetermined sequence of Backoff Signal slot selections used by an HPNA v2 STA does not include a Backoff Signal slot selection that is associated with the highest access priority.

12. The method according to claim 9, wherein the step of repeatedly selecting a Backoff Signal slot for gaining access to the communications medium is based on a predetermined sequence of Backoff Signal slot selections.

13. The method according to claim 1, further comprising a step of at least one selected non-MC STA receiving the message from the MC STA.

14. The method according to claim 13, further comprising a step of responding at each selected non-MC STA receiving the message with a frame transmitted with the highest physical layer priority level available in an HPNA v2-formatted frame at an appropriate time based on the first message from the MC STA.

15. The method according to claim 13, wherein the received message includes a Medium Allocation Packet (MAP) for a plurality of non-MC STAs, the MAP including information relating to one of a specific time period assigned to each of the plurality of non-MC STAs, an order for each of the plurality of non-MC STAs to use the communications medium, an order for transmissions for each of the plurality of non-MC STAs, and a maximum time for each of the plurality of non-MC STAs to occupy the communications medium.

16. The method according to claim 13, further comprising a step of receiving a reply message at the MC STA from at least one selected non-MC STA in response to the transmitted message from the MC STA, the received message starting at a highest physical layer priority level available in a second HPNA v2-formatted frame.

17. The method according to claim 1, wherein at least one HPNA v2 STA is associated with the communications medium,

the method further comprising a step of remapping each priority level at the link sublayer for each HPNA v2 STA that is associated with the communications medium prior to the step of transmitting the message from the MC STA so that no data packet from an upper layer in each HPNA v2 STA associated with the communications medium is mapped to the highest physical layer priority level of a MAC sublayer of the HPNA v2 STA.

18. A method for providing access to a communications medium, the communications medium being suitable for allowing use of a plurality of Home Phoneline Network Association (HPNA) v2-formatted frames, each HPNA v2-formatted frame being timed to allow a plurality of physical layer priority level slots, the method comprising steps of:

receiving a message at a non-Media Control Station (non-MC STA) from a Media Control(MC) STA, the non-MC STA and the MC STA each being enhanced STAs

that gain access to the communications medium in a centralized manner, the MC STA maintaining a list of sessions in enhanced STAs using the communications medium, the received message starting at a highest physical layer priority level slot available with a first HPNA v2-formatted frame; and

transmitting a reply message from the non-MC STA in response to the received message to the MC STA, the reply message being transmitted at the highest physical layer priority level available in a second HPNA v2-formatted frame.

19. The method according to claim 18, wherein a frame encoding of at least one HPNA v2-formatted frame is modified to allow a higher encoding rate than permitted by HPNA v2.

20. The method according to claim 18, wherein a frame header encoding of at least the first HPNA v2 formatted frame is modified to allow one of a polling frame, a beacon frame, a Centralized Contention (CC) frame, and a management frame.

21. The method according to claim 20, wherein when the HPNA v2-formatted frame is modified to allow a Medium Allocation Element (MAE) in the management frame.

22. The method according to claim 21, wherein the management frame is a

Beacon frame.

23. The method according to claim 18, wherein the received message is one of a polling frame and a polling frame plus a data frame, and includes an encoding indicating a frame type within a body of the transmitted message.

24. The method according to claim 18, wherein the received message includes a Medium Allocation Packet (MAP) for a plurality of non-MC STAs, the MAP including information relating to one of a specific time period assigned to each of the plurality of non-MC STAs, an order for each of the plurality of non-MC STAs to use the communications medium, an order for transmissions for each of the plurality of non-MC STAs, and a maximum time for each of the plurality of non-MC STAs to occupy the communications medium.

25. The method according to claim 18, wherein the highest physical priority level slot of the first HPNA v2-formatted frame is PRI 7.

26. The method according to claim 18, wherein at least one HPNA v2 STA is associated with the communications medium,
the method further comprising steps of:

determining at the non-MC STA whether the reply message has collided with a message transmitted from an HPNA v2 STA;

selecting a Backoff Signal slot at the non-MC STA for contending for access to the communications medium when the reply message is determined to have collided with a message from an HPNA v2 STA, the selected Backoff Signal slot being associated with a highest access priority to the communications medium; and

retransmitting the collided reply message to the MC STA when access priority to the communications medium is gained.

27. The method according to claim 26, wherein the step of selecting the Backoff Signal includes a step of repeatedly selecting a Backoff Signal until the non-MC STA gains access priority to the communications medium over each HPNA v2 STA.

28. The method according to claim 27, wherein at least one HPNA v2 STA repeatedly selects a Backoff Signal slot based on a predetermined sequence of Backoff Signal slot selections.

29. The method according to claim 27, wherein each predetermined sequence of Backoff Signal slot selections does not include a Backoff Signal slot selection that is associated with the highest access priority.

30. The method according to claim 27, wherein the step of repeatedly selecting a Backoff Signal slot for gaining access priority to the communications medium is based on a predetermined sequence of Backoff Signal slot selections.

31. The method according to claim 18, wherein at least one HPNA v2 STA is associated with the communications medium, and

wherein each priority level is remapped at the link sublayer for each HPNA v2 STA that is associated with the communications medium prior to the step of receiving the message from the MC STA so that no data packet from an upper layer in each HPNA v2 STA is mapped to the highest physical layer priority level of a MAC sublayer of each HPNA v2 STA.

32. A communications network, comprising:

a communications medium that is suitable for allowing use of a plurality of HPNA v2-formatted frames, each HPNA v2-formatted frame being timed to allow a plurality of physical layer priority level slots; and

a Media Control Station (MC STA) maintaining a list of sessions in enhanced stations (STAs) using the communications medium, each enhanced STA being one of the MC STA and a non-MC STA, and gaining access to the communications medium in a

centralized manner, the MC STA transmitting a message to at least one selected non-MC STA using the communications medium, the transmitted message being transmitted with a highest physical layer priority level available in a first HPNA v2-formatted frame.

33. The communications according to claim 32, wherein a frame encoding of at least one HPNA v2-formatted frame is modified to allow a higher encoding rate than permitted by HPNA v2.

34. The communications network according to claim 32, wherein a frame header encoding of at least the first HPNA v2-formatted frame is modified to allow one of a polling frame, a beacon frame, a Centralized Contention (CC) frame, and a management frame.

35. The communications network according to claim 34, wherein when the HPNA v2-formatted frame is modified to allow a Medium Allocation Element (MAE) in the management frame.

36. The communications network according to claim 35, wherein the management frame is a Beacon frame.

37. The communications network according to claim 32, wherein the transmitted

message is one of a polling frame, a data frame and a management frame, and includes an encoding indicating a frame type within a body of the transmitted message.

38. The communications network according to claim 32, wherein the highest physical priority level slot of the first HPNA v2-formatted frame is PRI 7.

39. The communications network according to claim 32, further comprising at least one HPNA v2 STA that is associated with the communications medium, and

wherein the MC STA determines whether the message has collided with a message transmitted from an HPNA v2 STA, selects a Backoff Signal slot for contending for access to the communications medium when the message is determined to have collided with a message from an HPNA v2 STA, the selected Backoff Signal slot being associated with a highest access priority to the communications medium, and retransmitting the collided message when access priority is to the communications medium is gained.

40. The communications network according to claim 39, wherein the MC STA repeatedly selects the highest priority Backoff Signal slot until the MC STA gains access priority to the communications medium over each HPNA v2 STA.

41. The communications network according to claim 40, wherein at least one

HPNA v2 STA repeatedly selects a Backoff Signal slot based on a predetermined sequence of Backoff Signal slot selections.

42. The communications network according to claim 41, wherein each predetermined sequence of Backoff Signal slot selections does not include a Backoff Signal slot selection that is associated with the highest access priority.

43. The communications network according to claim 40, wherein the MC STA repeatedly selects a Backoff Signal slot for gaining access priority to the communications medium based on a predetermined sequence of Backoff Signal slot selections.

44. The communications network according to claim 41, wherein the message from the MC STA is received at at least one selected non-MC STA.

45. The communications network according to claim 44, wherein selected non-MC STA receiving the message responds with a frame transmitted using the highest physical layer priority level available in an HPNA v2-formatted frame at an appropriate time based on the received message from the MC STA.

46. The communications network according to claim 44, wherein the received

message includes a Medium Allocation Packet (MAP) for a plurality of non-MC STAs, the MAP including information relating to one of a specific time period assigned to each of the plurality of non-MC STAs, an order for each of the plurality of non-MC STAs to use the communications medium, an order for transmissions for each of the plurality of non-MC STAs, and a maximum time for each of the plurality of non-MC STAs to occupy the communications medium.

47. The communications network according to claim 44, wherein the MC STA receives a reply message from at least one selected non-MC STA in response to the transmitted message from the MC STA, the received message starting at a highest physical layer priority level available in a second HPNA v2-formatted frame.

48. The communications network according to claim 44, further comprising at least one HPNA v2 STA that is associated with the communications medium, and wherein the MC STA remaps each priority level at the link sublayer for each HPNA v2 STA that is associated with the communications medium prior to transmitting the message so that no data packet from an upper layer in each HPNA v2 STA associated with the communications medium is mapped to the highest physical layer priority level of a MAC sublayer of the HPNA v2 STA.

49. A communications network, comprising:

a communications medium that is suitable for allowing use of a plurality of HPNA formatted frames, each HPNA formatted frame being time to allow a plurality of physical layer priority level slots; and

a non-Media Control Station (non-MC STA) receiving a message from a Media Control(MC) STA, the non-MC STA and the MC STA each being enhanced STAs that gain access to the communications medium in a centralized manner, the MC STA maintaining a list of sessions in enhanced STAs using the communications medium, the received message starting in a highest physical layer priority level available in a first HPNA v2-formatted frame, the non-MC STA transmitting a reply message in response to the received message to the MC STA, the reply message being transmitted using the highest physical layer priority level available with a second HPNA v2-formatted frame.

50. The communications network according to claim 49, wherein a frame encoding of at least one HPNA v2-formatted frame is modified to allow a higher encoding rate than permitted by HPNA v2.

51. The communications network according to claim 49, wherein a frame header encoding of at least the first HPNA v2 formatted frame is modified to allow one of a polling frame, a beacon frame, a Centralized Contention (CC) frame, and a management frame.

52. The communications network according to claim 51, wherein when the HPNA v2-formatted frame is modified to allow a Medium Allocation Element (MAE) in the management frame.

53. The communications network according to claim 52, wherein the management frame is a Beacon frame.

54. The communications network according to claim 49, wherein the received message is one of a polling frame and a polling frame plus a data frame, and includes an encoding indicating a frame type within a body of the transmitted message.

55. The communications network according to claim 49, wherein the highest physical priority level slot of the first HPNA v2 formatted frame is PRI 7.

56. The communications network according to claim 55, further comprising at least one HPNA v2 STA that is associated with the communications medium, wherein the non-MC STA determines whether the reply message has collided with a message transmitted from an HPNA v2 STA, selects a Backoff Signal slot for contending for access to the communications medium when the reply message is determined

to have collided with a message from an HPNA v2 STA, the selected Backoff Signal slot being associated with a highest access priority to the communications medium, the non-MC STA retransmitting the reply message when access priority to the communications medium is gained.

57. The communications network according to claim 56, wherein the non-MC STA repeatedly selects the highest access priority Backoff Signal until the non-MC STA gains access priority to the communications medium over each HPNA v2 STA.

58. The communications network according to claim 57, wherein at least one HPNA v2 STA repeatedly selects a Backoff Signal slot based on a predetermined sequence of Backoff Signal slot selections.

59. The communications network according to claim 58, wherein each predetermined sequence of Backoff Signal slot selections does not include a Backoff Signal slot selection that is associated with the highest access priority.

60. The communications network according to claim 56, wherein the non-MC STA repeatedly selects a Backoff Signal slot for gaining access priority to the communications medium based on a predetermined sequence of Backoff Signal slot

selections.

61. The communications network according to claim 49, further comprising at least one HPNA v2 STA that is associated with the communications network communications medium, and

wherein each priority level is remapped at the link sublayer for each HPNA v2 STA that is associated with the communications medium prior to the message being received by the non-MC STA so that no data packet from an upper layer in each HPNA v2 STA is mapped to the highest physical layer priority level of a MAC sublayer of each HPNA v2 STA.

62. A Media Controller station (MC STA) for a communications network, the MC STA comprising:

a QoS (Quality of Service) management entity (QME) receiving at least one end-to-end QoS message characterizing a user application, the at least one end-to-end QoS message including at least one QoS parameter set that is expressed at a layer that is higher than the Media Access Control (MAC) sublayer of an HPNA v2 network and is to be passed down to the MAC sublayer of the MC STA for enabling QoS traffic transport of the application; and

an admission control entity (ACE) performing a centralized admission control

decision relating to the application based on the at least one end-to-end QoS message characterizing the application.

63. The MC STA according to claim 62, wherein the communications network includes a communications medium, the communications medium being suitable for allowing use of a plurality of HPNA v2-formatted frames, each HPNA v2-formatted frame being timed to allow a plurality of physical layer priority level slots, and

wherein the MC STA maintains a list of sessions in enhanced STAs using the communications medium, each enhanced STA being one of the MC STA and a non-MC STA, each enhanced STA gaining access to the communications medium in a centralized manner, and the MC STA transmitting a message to at least one selected non-MC STA using the communications medium, the transmitted message being transmitted with a highest physical layer priority level available in a first HPNA v2-formatted frame.

64. The MC STA according to claim 63, wherein a frame encoding of at least one HPNA v2-formatted frame is modified to allow a higher encoding rate than permitted by HPNA v2.

65. The MC STA according to claim 64, wherein a frame header encoding of at least the first HPNA v2-formatted frame is modified to allow one of a polling frame, a

beacon frame, a Centralized Contention (CC) frame, and a management frame.

66. The MC STA according to claim 65, wherein when the HPNA v2-formatted frame is modified to allow a Medium Allocation Element (MAE) in the management frame.

67. The MC STA according to claim 66, wherein the management frame is a Beacon frame.

68. The MC STA according to claim 63, wherein the transmitted message is one of a polling frame, a data frame and a management frame, and includes an encoding indicating a frame type within a body of the transmitted message.

69. The MC STA according to claim 63, wherein the highest physical priority level slot of the first HPNA v2-formatted frame is PRI 7.

70. The MC STA according to claim 63, further comprising at least one HPNA v2 STA that is associated with the communications medium, and

wherein the MC STA determines whether the message has collided with a message transmitted from an HPNA v2 STA, selects a Backoff Signal slot for contending for access to the communications medium when the message is determined to have collided with

a message from an HPNA v2 STA, the selected Backoff Signal slot being associated with a highest access priority to the communications medium, and retransmitting the collided message when access priority to the communications medium is gained.

71. The MC STA according to claim 70, wherein the MC STA repeatedly selects the highest priority Backoff Signal slot until the MC STA gains access priority to the communications medium over each HPNA v2 STA.

72. The MC STA according to claim 70, wherein at least one HPNA v2 STA repeatedly selects a Backoff Signal slot based on a predetermined sequence of Backoff Signal slot selections.

73. The MC STA according to claim 62, wherein each predetermined sequence of Backoff Signal slot selections does not include a Backoff Signal slot selection that is associated with the highest access priority.

74. The MC STA according to claim 71, wherein the MC STA repeatedly selects a Backoff Signal slot for gaining access to the communications medium based on a predetermined sequence of Backoff Signal slot selections.

75. The MC STA according to claim 63, wherein the message from the MC STA is received at at least one selected non-MC STA.

76. The MC STA according to claim 75, wherein each selected non-MC STA receiving the message responds with a frame using the highest physical layer priority level slot of an HPNA v2 formatted frame.

77. The MC STA according to claim 75, wherein the received message includes a Medium Allocation Packet (MAP) for a plurality of non-MC STAs, the MAP including information relating to one of a specific time period assigned to each of the plurality of non-MC STAs, an order for each of the plurality of non-MC STAs to use the communications medium, an order for transmissions for each of the plurality of non-MC STAs, and a maximum time for each of the plurality of non-MC STAs to occupy the communications medium.

78. The MC STA according to claim 75, wherein the MC STA receives a reply message from at least one selected non-MC STA in response to the transmitted message from the MC STA, the received message starting at a highest physical layer priority level available in a second HPNA v2-formatted frame.

79. The MC STA according to claim 63, further comprising at least one HPNA v2 STA that is associated with the communications medium, and

wherein the MC STA remaps each priority level at the link sublayer for each HPNA v2 STA that is associated with the communications medium prior to transmitting the message so that no data packet from an upper layer in each HPNA v2 STA associated with the communications medium is mapped to the highest physical layer priority level of a MAC sublayer of the HPNA v2 STA.

80. A method for providing access to a communications medium, the communications medium being suitable for allowing use of a plurality of Home Phoneline Network Association (HPNA) v2-formatted frames, each HPNA v2-formatted frame being timed to allow a plurality of physical layer priority level slots, the method comprising steps of:

remapping at the link sublayer for each HPNA v2 STA that is associated with the communications medium so that no data packet from an upper layer in each HPNA v2 STA is mapped to the highest physical layer priority level of a MAC sublayer of each HPNA v2 STA;

transmitting a message from a Media Control Station (MC STA) to at least one selected non-Media Control Station (non-MC STA), the transmitted message being transmitted with a highest physical layer priority level available in a first HPNA v2-formatted

81. The method according to claim 80, further comprising a step of maintaining a list at the MC STA of sessions in enhanced STAs using the communications medium, each enhanced STA being one of the MC STA and a non-MC STA and gaining access to the communications medium in a centralized manner.

82. The method according to claim 80, wherein a frame encoding of at least one HPNA v2-formatted frame is modified to allow a higher encoding rate than permitted by HPNA v2.

83. The method according to claim 80, wherein a frame header encoding of at least the first HPNA v2-formatted frame is modified to allow one of a polling frame, a beacon frame, a Centralized Contention (CC) frame, and a management frame.

84. The method according to claim 83, wherein when the HPNA v2-formatted frame is modified to allow a Medium Allocation Element (MAE) in the management frame.

85. The method according to claim 84, wherein the management frame is a Beacon frame.

86. The method according to claim 80, wherein the transmitted message is one of a polling frame, a data frame and a management frame, and including an encoding indicating a frame type within the transmitted frame.

87. The method according to claim 80, wherein the highest physical priority level slot of the first HPNA v2-formatted frame is PRI 7.

88. The method according to claim 80, further comprising a step of receiving the message at at least one selected non-MC STA.

89. The method according to claim 88, further comprising a step of responding at each selected non-MC STA receiving the message starting at the highest physical layer priority level available in an HPNA v2-formatted frame.

90. The method according to claim 89, wherein the received message includes a Medium Allocation Packet (MAP) for a plurality of non-MC STAs, the MAP including information relating to one of a specific time period assigned to each of the plurality of non-MC STAs, an order for each of the plurality of non-MC STAs to use the communications medium, an order for transmissions for each of the plurality of non-MC STAs, and a

maximum time for each of the plurality of non-MC STAs to occupy the communications medium.

91. The method according to claim 88, further comprising a step of receiving a reply message at the MC STA from at least one selected non-MC STA in response to the transmitted message from the MC STA, the received message starting at a highest physical layer priority level available in a second HPNA v2-formatted frame.